The main determinants of the health status of the populations

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- **MOTIVATION**

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- Over the last century, we obeserved, in OECD countries, a decrease of mortality and an increase of life expectancy at birth. More recently, the death rates among the older population also began to decline.

- What's the determinants that explain **these additional years of life?** And these gains are obtained through:
  - ➤ the improvement of living conditions; and/or
  - ➤ progress in the health sector; and/or
  - ➤ more healthcare spending, but more years of life in a state of illness and dependency?

- The health status of the populations began to be explained by life expectancy at birth, life expectancy at different ages (40, 60, 65, 85, for example), premature mortality, infant mortality, crude mortality rate, among others.

- … but these indicators don't consider the quality of life and/or disability.

- Due to this limitation it began to appear different indicators that combine mortality and morbidity in the same indicator. For example: Disability Adjusted Life Expectancy (DALE), Health Adjusted Life Expectancy (HALE), the Disability Free Life Expectancy (DFLE), Quality Adjusted Life Years (QALYS) and Disability Adjusted Life Years (DALYS).

- We create a new indicator: **Average Life Expectancy Adjusted by the Perceived Health Status −** $ALEAPHS$**.**

- Some institutions as WHO and the European Commission recommended that as self-reported health is a reasonable realistic predictor of total mortality, psychological and medical symptoms.

- Some studies prove that self-reported health is, in almost of the cases, in accordance with the doctor's evaluation (Hunt *et al*, 1980).

- We intend to expand this literature in the following topics:

  ➤ we create a new indicator: **Average Life Expectancy Adjusted by the Perceived Health Status −** $ALEAPHS$**.**

  ➤ we use a Multiple Imputation technique in order to overcome the problem of missing data by using a panel data analysis; and

  ➤ we analyze the impact of technological innovation through the creation of technological composite index.

- We use OECD Health Data, 2012, covers 30 countries for a 31-years period (1980 to 2011).

- The **dependent variable** used is the Average Life Expectancy Adjusted by the Perceived Health Status − $ALEAPHS$.

Table nr.º 1 - Explanatory variables

Factors	Name	Definition
Socio-economic	GDP_{pc}	Gross Domestic Product *per capita* in US dollars - PPP
	HE_{pc}	Total health expenditure *per capita* in US dollars - PPP
	URB	Proportion of urban population
Human behaviors	ALCOOL	Alcohol consumption in liters *per capita*
	SMOK	Tobacco consumption – cigarettes *per smoker per day*
	FAT	Total fat intake in grammas *per capita per day*
Institutional variables	GOV	Health expenditure financed by Government as % of total healthcare spending
	THSE	Total health and social employment *per* 1.000 population
	BED	The total number of hospital beds *per* 1.000 population
	EDUC	Public spending on education as % of GDP
	INDEX	Technological composite index

Table nr.º 2 - Estimated coefficients by 1-Fixed Effect Model for $ALEAPHS$

|	F	M
GDP_{pc}	$2{,}99^b$	$4{,}12^a$
HE_{pc}	$3{,}26^a$	$2{,}01^b$
URB	$-26{,}44^a$	$-18{,}56^a$
ALCOOL	$-1{,}04$	$-2{,}05^b$
SMOK	$-0{,}2$	$-0{,}05$
FAT	$2{,}15$	$1{,}99$
GOV	$-4{,}28^a$	$-5{,}63^a$
THSE	$-0{,}12$	$0{,}44$
BED	$1{,}09^c$	$0{,}38$
EDUC	1	$1{,}53^b$
INDEX	$-6{,}54^a$	$-6{,}63^a$
INDSQ	$7{,}06^a$	$7{,}07^a$
Const	$139{,}54^a$	$105{,}75^a$
R^2	$0{,}98195962^e$	$0{,}98072804^e$
F-statistic	$374{,}91$	$481{,}07$
F-test	0.000	0.000
F-test against 0 - FEM	$166{,}84^a$	$189{,}13^a$

Definitions: a, b, c represent 1%, 5% and 10% levels of significance. e: This value was estimated. Country and time-dummies are not present.

Table n.º 3: Effect of technological composite index in Average Life Expectancy

	IND	INDSQ
Men	1.44872[b]	-2.150789[a]
Women	4.650939[a]	-5.882433[a]

Definitions: a, b, c represent 1%, 5% and 10% levels of significance.

The technological innovation has a positive and significant effect in average life expectancy in both genders.
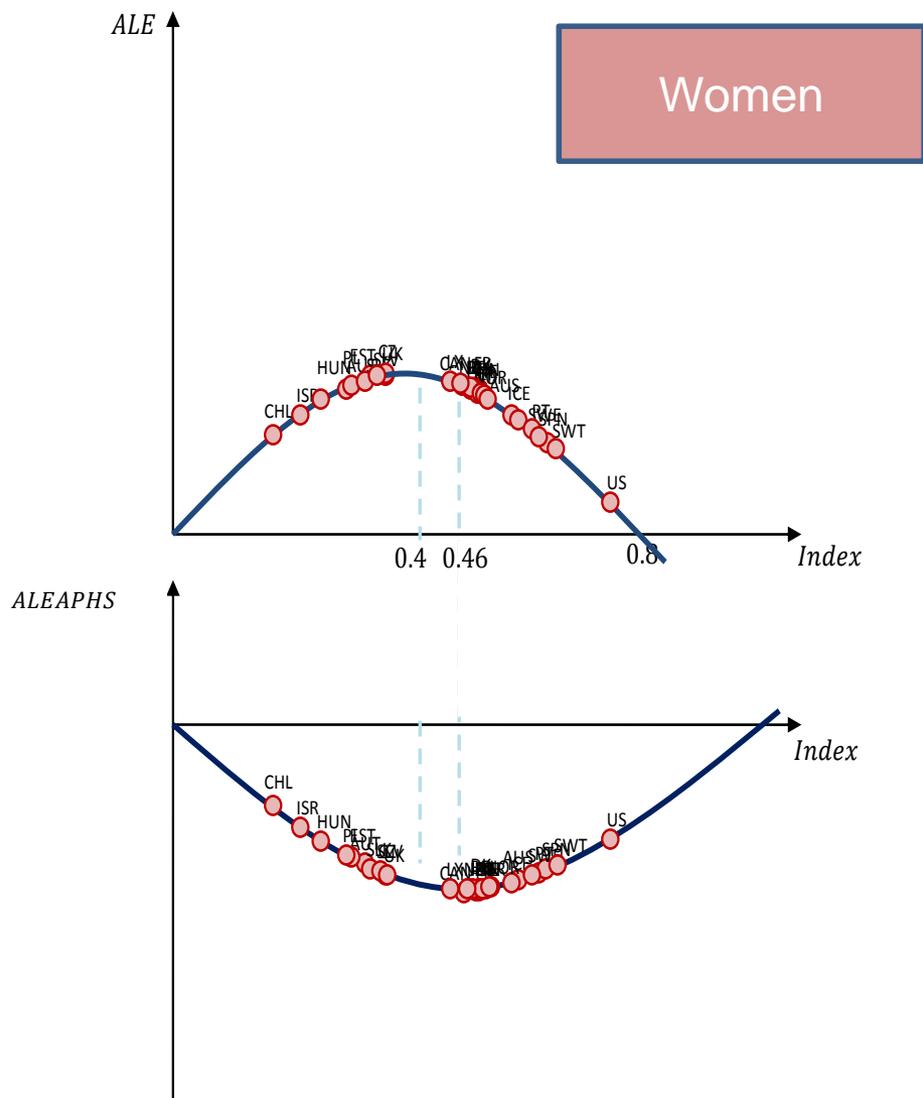
Men
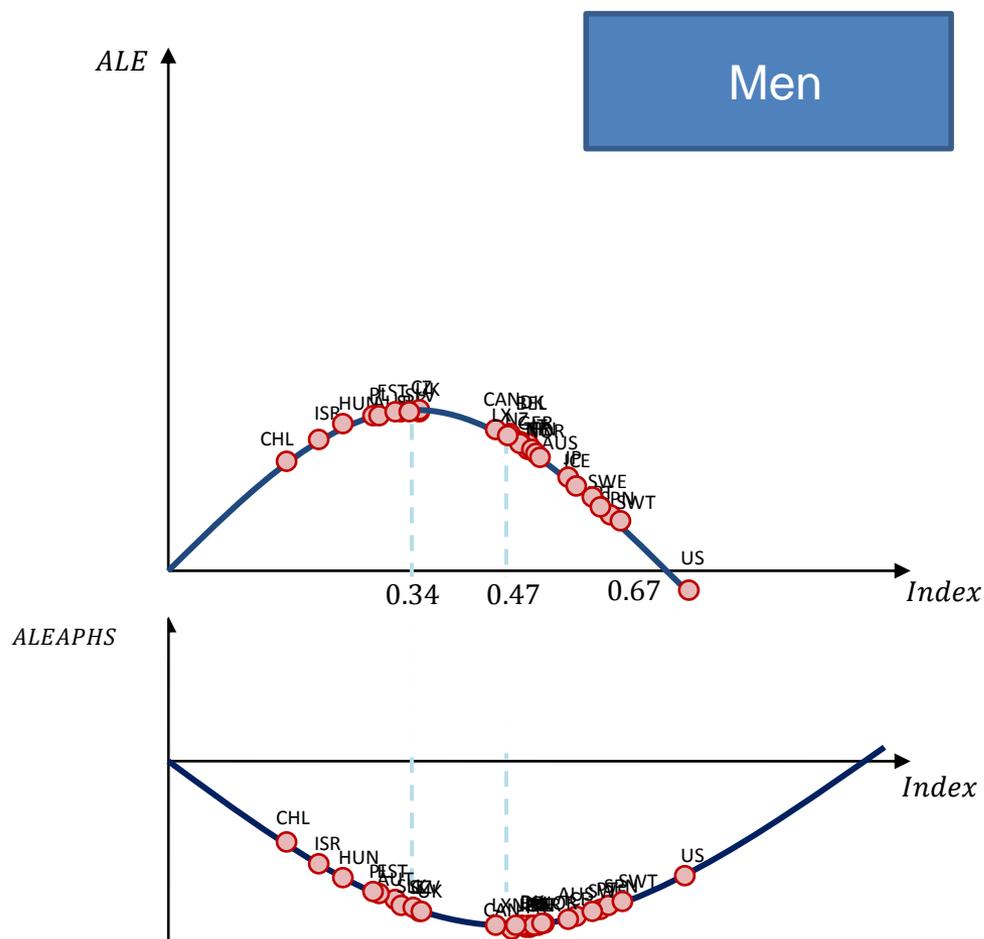
0-0.34: The increase in the technological level will only increase the number of years with disability.

0.34-0.68: additional technological investment will begin to cancel out the positive effects of past technological investments in health expectancy.

0.47: there is a positive contribution of technological innovation in ALEAPHS but negative in life expectancy. In this case, the new technologies help to increase ALEAPHS, reducing the years of life with disability.

Countries in the left side of 0.34: Chile; Israel; Hungary and Poland. Countries between 0.34 and 0.47: Estonia; Slovakia; Ireland; Australia; UK; Slovenia; Czech Republic; Luxembourg and Canada. Countries in the right side of 0.47: New Zealand; Japan; Germany; Denmark; Netherland; France; Finland; Italy; Belgium; Norway; Iceland; Sweden; Portugal; Spain; Switzerland and USA.

Women

0-0.4: The increase in the technological level will only increase the number of years with disability.

0.4-0.8: additional technological investment will begin to cancel out the positive effects of past technological investments in health expectancy.

0.46: there is a positive contribution of technological innovation in ALEAPHS but negative in life expectancy. In this case, the new technologies help to increase ALEAPHS, reducing the years of life with disability.

Countries in the left side of 0.4: Chile; Israel; Hungary; Poland; Estonia; Slovakia; Ireland; Australia; UK and Slovenia. Countries between 0.4 and 0.46: Luxembourg and Czech Republic. Countries in the right side of 0.46: Canada; New Zealand; Japan; Germany; Denmark; Netherland; France; Finland; Italy; Belgium; Norway; Iceland; Sweden; Portugal; Spain; Switzerland and USA.

- Over time, the countries began to invest more in technologies and procedures that take into account not only the treatment of the diseases but also the prevention of the same and the quality of patient's life. These became possible through the development of genetic, nanotechnology and robotics, which allowed the development of non invasive and low invasive medical devices. Some of these developments hold the potential to prolong and improve life such as: pacemaker; insulin pen; human papilloma virus vaccine; natural orifice surgery; Ventricular Assist Device, etc.

- The decline in mortality rate over the years gives relatively more importance to chronic diseases and their consequences, as reduced productivity, prolonged disability, the need for care and death. In this way, some countries decided to develop integrated long-term care with the aim of increase the life quality of patients with chronic diseases.

Thanks for your attention!!!

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